

0051973

CERTIFICATE OF ANALYSIS

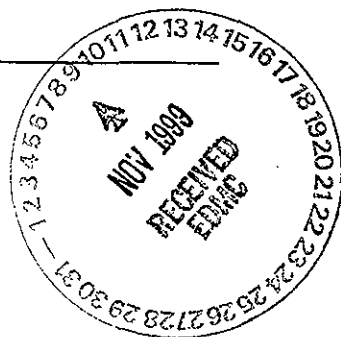
Bechtel Hanford, Inc.
 3350 George Washington Way
 Richland, WA 99352

August 19, 1999

Attention: Joan Kessner



| | | |
|----------------------------|---|----------------|
| SAF Number | : | B99-082 |
| Date First Sample Received | : | July 19, 1999 |
| Number of Samples | : | One |
| Sample Type | : | Water |
| SDG Number | : | W02839 |
| Data Deliverable | : | 21 Day Summary |



I. Introduction

On July 19, 1999, one water sample was received by the Quanterra Environmental Services Richland Laboratory (QESRL) for chemical analysis. Upon receipt, the sample was assigned the following laboratory ID number to correspond with the Bechtel Hanford, Inc. (BHI) specific ID's as found on the first page of the attached report.

II. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information; analytical results and the appropriate associated statistical errors.

The requested analysis was: **Hexavalent Chromium**
Hexavalent Chromium by EPA7196

III. Quality Control

Bechtel Hanford, Inc.
August 19, 1999
Page 2

The analytical results for the analysis include a minimum of one Laboratory Control Sample (LCS), one matrix spike (MS), one matrix spike duplicate (MSD), and one method (reagent) blank. Any exceptions have been noted in the "Comments" section.

Quality control sample results are reported in the same units as sample results.

IV. Comments

Hexavalent Chromium

Hexavalent Chromium by EPA7196

The LCS, MS, MSD, batch blank, and sample results are within the requirements of the contract.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Reviewed and approved:

A handwritten signature in black ink, appearing to read "Doug Swenson", written over a horizontal line.

Doug Swenson
Project Manager

SAMPLE RESULTS

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02839 / 8440
LAB SAMPLE ID: 9D08JP10 MATRIX: WATER
CLIENT ID: B0W107 DATE RECEIVED: 7/19/99 4:30:00 PM

| ANALYTE | RESULT | Q | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA/IDL | REPORT UNIT | YIELD | METHOD NUMBER |
|-----------|----------|---|------------------------|---------------------|----------|----------------|-------|------------------|
| HEXCHROME | 2.00E-03 | U | N/A | N/A | 2.00E-03 | mg/L | N/A | EPA7196 |

Number of Results:

DUPLICATE RESULTS

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02839 / 8440
LAB SAMPLE ID: D08JP14R MATRIX: WATER
CLIENT ID: B0W107 DATE RECEIVED: 7/19/99 4:30:00 PM
ORIG LAB SAMPLE ID: 9D08JP10

| ANALYTE | DUP RESULT | COUNTING Q ERROR (2 s) | TOTAL ERROR (2 s) | MDA/ IDL | REPORT UNIT | YIELD | METHOD NUMBER | ORIG RESULT | RPD |
|-----------|---------------|----------------------------|-----------------------|-------------|----------------|-------|------------------|----------------|---------|
| HEXCHROME | 2.00E-03 | U | N/A | N/A | 2.00E-03 mg/L | N/A | EPA7196 | 2.00E-02 | 163.64% |

Number of Results:

BLANK RESULTS

LAB NAME: QUANTERRA, Richland SDG /RPT GRP: W02839 / 8440
LAB SAMPLE ID: D096K11B MATRIX: WATER

| ANALYTE | RESULT | Q | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA/IDL | REPORT UNIT | YIELD | METHOD NUMBER |
|-----------|----------|---|------------------------|---------------------|----------|----------------|-------|------------------|
| HEXCHROME | 0.00E+00 | U | N/A | N/A | 2.00E-03 | mg/L | N/A | EPA7196 |

Number of Results:

LABORATORY CONTROL SAMPLE

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02839 / 8440
LAB SAMPLE ID: D096K12S MATRIX: WATER

| ANALYTE | RESULT | Q | COUNTING ERROR (2 s) | TOTAL ERROR (2 s) | MDA/ IDL | REPORT UNIT | YIELD | EXPECTED | RECOVERY |
|-----------|----------|---|-------------------------|----------------------|-------------|----------------|-------|----------|----------|
| HEXCHROME | 4.95E-01 | | N/A | N/A | 2.00E-03 | mg/L | N/A | 5.00E-01 | 99.00% |

Number of Results:

MATRIX SPIKE RESULTS

LAB NAME: QUANTERRA, Richland **SDG: /RPT GRP:** W02839 / 8440
LAB SAMPLE ID: D08JP12W **MATRIX:** WATER

| ANALYTE | SPIKE RESULT* Q | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA/IDL | REPORT UNIT | SAMPLE RESULT | EXPECTED | RECOVERY |
|-----------|--------------------|------------------------|---------------------|----------|----------------|------------------|----------|----------|
| HEXCHROME | 5.24E-01 | N/A | N/A | 2.00E-03 | mg/L | 2.00E-02 | 5.26E-01 | 99.62% |

Number of Results:

*Spike Result Corrected For Sample Result

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result < RDL.

Quanterra Analytical Services, Inc
rptChemRadMatrixSpike; v3.41

0008

MATRIX SPIKE RESULTS

LAB NAME: QUANTERRA, Richland SDG: /RPT GRP: W02839 / 8440
LAB SAMPLE ID: D08JP13W MATRIX: WATER

| ANALYTE | SPIKE RESULT* | Q | COUNTING ERROR (2s) | TOTAL ERROR (2s) | MDA/IDL | REPORT UNIT | SAMPLE RESULT | EXPECTED | RECOVERY |
|-----------|------------------|---|------------------------|---------------------|----------|----------------|------------------|----------|----------|
| HEXCHROME | 5.24E-01 | | N/A | N/A | 2.00E-03 | mg/L | 2.00E-02 | 5.26E-01 | 99.62% |

Number of Results:

*Spike Result Corrected For Sample Result

Result = IDL When Not Detected

(Q)ualifiers: U = Analyte result < MDA/IDL,
J = No U qualifier and result < RDL.Quanterra Analytical Services, Inc
rptChemRadMatrixSpike; v3.41

0009



Richland Laboratory
Data Review Check List
METALS

| Work Order Number(s): D08JP101 | | QC Batch - 9201295 | | |
|--|------------|--------------------|------------|-------------------------------------|
| Lab Sample Numbers or SDG: W02839 | | | | |
| Method/Test/Parameter: ORH in water RICHWC5003 R.3 | | | | |
| Review Item | Yes (✓) | No (✓) | N/A (✓) | 2 nd Level Review (✓) |
| A. Initial Calibration | | | | |
| 1. Performed at required frequency with required number of levels? | ✓ | | | |
| 2. Correlation coefficient within QC limits? | ✓ | | | |
| 3. Initial calibration verification (ICV) analyzed immediately after calibration and results within QC limits? | ✓ | | | |
| 4. Initial calibration blank (ICB) analyzed immediately after ICV and concentrations of all parameters ≤ reporting limit? | ✓ | | | |
| B. Continuing Calibration | | | | |
| 1. CCV analyzed at required frequency and all parameters within QC limits? | ✓ | | | |
| 2. CCB analyzed at required frequency and all results ≤ reporting limit? | ✓ | | | |
| C. Sample Analysis | | | | |
| 1. Were any samples with concentrations above the linear range for any parameter diluted and reanalyzed? | | ✓ | | |
| 2. Were all sample holding times met? | ✓ | | | |
| D. QC Samples | | | | |
| 1. All results for the preparation blank below limits? | ✓ | | | |
| 2. MS or MS/MSD recoveries within QC limits and %RPD (for MSD) acceptable? | ✓ | | | |
| 3. LCS percent recovery within QC limits and %RPD (for LCSD) acceptable? | ✓ | | | |
| 4. Analytical spikes within QC limits where applicable? | | | ✓ | |
| 5. ICP only: One serial dilution performed per SDG? | | | ✓ | |
| 6. ICP only: CRDL standard (CRI or CRA) analyzed at required frequency? | | | ✓ | |
| 7. ICP only: Interference check samples (ICSA, ICSAB) and HICAL analyzed at the required frequencies and within QC limits? | | | ✓ | |

CHAIN OF CUSTODY FORMS

| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|---|--|---------------------------|--|---|----------------------------------|----------------------|----------|-----------------------------------|--|---|--|--|--|--|--|-----------------------------------|--|--|--|--|----------------------------------|--|--|--|--|
| Bechtel Hanford Inc. | | CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST | | | | | | B99-082-03 | | Page <u>1</u> of <u>1</u> | | | | | | | | | | | | | | | | | |
| Collector Fahlberg/ Porter | | Company Contact J Adler | | Telephone No. 373-4316 | | Project Coordinator TRENT, SJ | | Price Code 7L | | Data Turnaround 21 Days | | | | | | | | | | | | | | | | | |
| Project Designation 105-DR FSB - QC Sample Analysis | | Sampling Location 105 DR | | | | SAF No. B99-082 | | | | | | | | | | | | | | | | | | | | | |
| Ice Chest No. | | Field Logbook No. EL 1281 | | | | Method of Shipment Hand Delivered | | | | | | | | | | | | | | | | | | | | | |
| Shipped To Quanterra Incorporated | | Offsite Property No. | | | | Bill of Lading/Air Bill No. | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | COA R105 DY 2870 | | | | | | | | | | | | | | | | | | | | | |
| POSSIBLE SAMPLE HAZARDS/REMARKS Special Handling and/or Storage | | | | Preservation | | None | Cool 4C | | | | | | | | | | | | | | | | | | | | |
| | | | | Type of Container | | P | P | | | | | | | | | | | | | | | | | | | | |
| | | | | No. of Container(s) | | 1 | 1 | | | | | | | | | | | | | | | | | | | | |
| | | | | Volume | | 20mL | 500mL | | | | | | | | | | | | | | | | | | | | |
| SAMPLE ANALYSIS <i>Due 8-10</i> <i>SDC W02839 JAG-200105</i> | | | | Activity Scan | | Chromium Hex - 7196 | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sample No. | | Matrix * | | Sample Date | | Sample Time | | | | | | | | | | | | | | | | | | | | | |
| BOW107 <i>D08 JF</i> | | Water | | 7-19-99 | | 1250 | | <i>X</i> | <i>X</i> | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CHAIN OF POSSESSION | | Sign/Print Names | | | | | | | | | | SPECIAL INSTRUCTIONS <i>Sample originated from a non radioactive area</i> | | | | Matrix * Soil Water Vapor Other Solid Other Liquid | | | | | | | | | | | |
| | | Relinquished By <i>R. Fahlberg</i> | | | | | Date/Time <i>7-19-99 1630</i> | | | | | | | | | | | Received By <i>Cindy Black</i> | | | | | Date/Time <i>7-19-99 1630</i> | | | | |
| | | Relinquished By | | | | | Date/Time | | | | | | | | | | | Received By | | | | | Date/Time | | | | |
| | | Relinquished By | | | | | Date/Time | | | | | | | | | | | Received By | | | | | Date/Time | | | | |
| | | Relinquished By | | | | | Date/Time | | | | | | | | | | | Received By | | | | | Date/Time | | | | |
| LABORATORY SECTION | | Received By | | | | | | | | | | | | | | Title | | Date/Time | | | | | | | | | |
| FINAL SAMPLE DISPOSITION | | Disposal Method | | | | | | | | | | | | | | Disposed By | | Date/Time | | | | | | | | | |

0013

Rad Analysis

| | | | Results Dry Weight of Concrete | | | | | | | | | | | |
|--------|-----------|----------|--------------------------------|----------------|-----------|--------|-------|-----------|-------------|------------|-------|--|--|--|
| Core # | Depth | Sample # | Am-241 MDA | Pu-239/240 MDA | U-238 MDA | Cs-137 | Sr-90 | Co-60 MDA | Ni-63 MDA | C-14 MDA | pCi/g | | | |
| 1 | 0-.25 in | B0N680 | 80 | 217 | 1.00U 2 | 17738 | 5560 | 501 | 49524 | 2.3U 29 | pCi/g | | | |
| 1 | .25-.5 in | B0N681 | 0.03 | 0.04 | 1.91 | 5.2 | 6.5 | 0.4U 0.6 | 4.7 | 0.1U 0.3 | pCi/g | | | |
| 1 | .5-.75 in | B0N682 | 0.05 | 0.03 | 0.40 | 3.6 | 0.9 | -0.2U 0.7 | 2.6 | 0.4U 0.8 | pCi/g | | | |
| 2 | 0-.25 in | B0N683 | 33 | 59 | 0.49U 1 | 14545 | 7625 | 94 | 4602 | 8.0 28 | pCi/g | | | |
| 2 | .25-.5 in | B0N684 | 0.03U 0.03 | 0.14 | 0.39 | 15.1 | 14.3 | -0.2U 0.8 | 2.7 | -0.03U 0.8 | pCi/g | | | |
| 2 | .5-.75 in | B0N685 | 0.04 | 0.04 | 0.52 | 2.9 | 0.5 | 0.6U 0.7 | -0.003U 0.7 | 0.3U 0.8 | pCi/g | | | |
| 3 | 0-.25 in | B0N686 | 39 | 140 | 0.24U 0.8 | 14167 | 4510 | 86 | 2875 | 6.9U 14 | pCi/g | | | |
| 3 | .25-.5 in | B0N687 | 0.04 | 0.08 | 0.54 | 16.4 | 7.5 | 0.1U 0.8 | 1.8 | 1.0 | pCi/g | | | |
| 3 | .5-.75 in | B0N688 | 0.02U 0.03 | 0.01 | 0.47 | 6.6 | 2.2 | 0.6U 0.8 | 0.8 | 0.2U 0.6 | pCi/g | | | |
| 4 | 0-.25 in | B0N689 | 31 | 68 | 0.57U 0.7 | 6039 | 3980 | 38 | 2186 | 0.4U 14 | pCi/g | | | |
| 4 | .25-.5 in | B0N690 | 0.04 | 0.13 | 0.39 | 9.6 | 6.4 | 0.4U 0.8 | 2.1 | 0.6U 0.7 | pCi/g | | | |
| 4 | .5-.75 in | B0N691 | 0.02U 0.02 | 0.06 | 0.33 | 3.8 | 1.4 | -0.3U 0.6 | 0.9 | 0.5U 0.7 | pCi/g | | | |
| 5 | 0-.25 in | B0N692 | 79 | 156 | 0.27U 0.8 | 7816 | 4653 | 63 | 3510 | 4.8U 15 | pCi/g | | | |
| 5 | .25-.5 in | B0N693 | 0.06 | 0.11 | 0.20 | 13.6 | 13.8 | 0.3U 0.7 | 0.1U 0.6 | 1.3 | pCi/g | | | |
| 5 | .5-.75 in | B0N694 | 0.04U 0.03 | 0.01U 0.01 | 0.43 | 2.9 | 1.5 | 0.05U 0.7 | 0.8 | 0.4U 0.7 | pCi/g | | | |

| Core # | Depth | Sample # | Am-241 MDA | Pu-239/240 MDA | U-238 MDA | Cs-137 | Sr-90 | Co-60 MDA | Ni-63 MDA | C-14 MDA | pCi/g | | | |
|--------|-----------|----------|------------|----------------|----------------|--------|-------|------------|-----------|-----------|-------|--|--|--|
| 1 | 0-.25 in | B0N894 | 0.00U 0.02 | 0.00U 0.03 | -0.002U 0.02 | 38.2 | 181 | 0.39U 0.4 | 4.44 | 0.08U 0.5 | pCi/g | | | |
| 1 | .25-.5 in | | | | | | | | | | | | | |
| 1 | .5-.75 in | | | | | | | | | | | | | |
| 2 | 0-.25 in | B0N895 | 0.01U 0.02 | 0.02U 0.01 | -0.0003U 0.004 | 43.5 | 226 | -0.01U 0.7 | 0.35 | 0.08U 0.8 | pCi/g | | | |
| 2 | .25-.5 in | | | | | | | | | | | | | |
| 2 | .5-.75 in | | | | | | | | | | | | | |
| 3 | 0-.25 in | B0N896 | 0.01U 0.03 | 0.11 | 0.001U 0.004 | 50.3 | 122 | 0.36U 0.6 | 5.59 | 0.06U 0.8 | pCi/g | | | |
| 3 | .25-.5 in | | | | | | | | | | | | | |
| 3 | .5-.75 in | | | | | | | | | | | | | |
| 4 | 0-.25 in | B0N897 | 0.01U 0.03 | 0.01U 0.01 | 0.011U 0.03 | 26.7 | 190 | -0.27U 0.7 | 3.25 | 0.11U 0.7 | pCi/g | | | |
| 4 | .25-.5 in | | | | | | | | | | | | | |
| 4 | .5-.75 in | | | | | | | | | | | | | |
| 5 | 0-.25 in | B0N898 | 0.01U 0.02 | 0.03 | 0.003U 0.02 | 31.6 | 126 | 0.22U 0.7 | 1.49 | 0.03U 0.5 | pCi/g | | | |
| 5 | .25-.5 in | | | | | | | | | | | | | |
| 5 | .5-.75 in | | | | | | | | | | | | | |

2.5g

Figure 1

SAMPLE CHECK-IN LIST

Date/Time Received: 7/19/99 1630 SG#: W028.39
 Work Order Number: J96-200105 SAF #: B99-082-03
 Shipping Container ID: 99-159 Chain of Custody #: 03

1. Custody Seals on shipping container intact? Yes ☒ No ☐
2. Custody Seals dated and signed? Yes ☒ No ☐
3. Chain-of-Custody record present? Yes ☒ No ☐
4. Cooler temperature 4°C
5. Vermiculite/packing materials is Wet ☐ Dry ☒
6. Number of samples in shipping container: 2
7. Sample holding times exceeded? 7/20/99 Yes ☐ No ☒

8. Samples have:
☒ tape NA hazard labels
☒ custody seals ☒ appropriate sample labels

9. Samples are:
☒ in good condition ☐ leaking
☐ broken ☐ have air bubbles

10. Where any anomalies identified in sample receipt? Yes ☐ No ☒
11. Description of anomalies (include sample numbers): _____
- _____
- _____

Sample Custodian/Laboratory: Cindy Black Date: 7-19-99
 Telephoned To: _____ On _____ By _____

Client Sample Screening Results

20-Jul-99

RS 7/20/99

| CLIENT CODE | ID | MATRIX | RECEIVED | DETECTOR | ACQ DATE | SAMPLE | MINUTES | CNTS A | NET CPM A | CNTS B | NET CPM B |
|-------------|---------|--------------|--------------------|------------|---------------------|----------------|----------------|----------------|-----------|--------|-------------|
| BIII | BOW107 | | 7/20/99 9:35:00 AM | QUAD24D | 7/20/99 10:18:12 AM | BOW107 | 30 | 3 | 0.04125 | 42 | 0.33375 |
| | D08JP | LIQUID | | Bkg: | 7/20/99 5:33:04 AM | BKG | 800 | 47 | 0.05875 | 853 | 1.06625 |
| <hr/> | | | | | | | | | | | |
| Anl Date: | 7/20/99 | Tot Sa, Alq: | 5.00E-01 | , 1.00E+01 | Alp; | (Dpm/ 1.09E-01 | (uCi/ 2.47E-06 | (pCi/ 4.93E+00 | ± 2.1E+01 | CAT | 5.1E+00 Lab |
| Ppt mg: | 0.5 | Units: | L | , ml | Bet; | Alq): 6.20E-01 | Sa): 1.40E-05 | L/g): 2.79E+01 | ± 1.9E+01 | I | 1.8E+00 Alq |
| | | | | | | | | | | | L/g |

0016

20-Jul-99

Quanterra Environment Services, SCP V2.03

1

COC Signature Page

| Lot or Batch #: | Initials/Date | Procedure # |
|-----------------|---------------|-----------------|
| 9201295 | | |
| Released By | JH 7-20-99 | RC-131 |
| Received | (R) 7/20/99 | RICHWC500.3 R.3 |
| Released By | (R) 7/20/99 | n/a |
| Received | | |
| Released By | | n/a |
| Received | | |
| Released By | | n/a |
| Received | | |
| Released By | | n/a |
| Received | | |
| Released By | | n/a |
| Received | | |
| Released By | | n/a |
| Received | | |

RQC050

Quanterra Incorporated
WET CHEM BATCHSHEET
RichlandRun Date: 7/20/99
Time: 13:02:49

PRODUCTION FIGURES - WET CHEM

| <u>TOTAL NUMBER</u> | <u>SAMPLE NUMBER</u> | <u>QC</u> | <u>RE-RUN MATRIX</u> | <u>RE-RUN OTHER</u> | <u>MISC NUMBER</u> | <u>TOTAL HOURS</u> | <u>EXPANDED DELIVERABLE</u> |
|-------------------------|--------------------------|-----------|--------------------------|-------------------------|------------------------|------------------------|---------------------------------|
|-------------------------|--------------------------|-----------|--------------------------|-------------------------|------------------------|------------------------|---------------------------------|

METHOD: EA Hexavalent Chromium
QC BATCH #: 9201295
PREP DATE: 7/20/99
USER: ROSSR6A)
INITIALS: _____
PREP _____
ANAL _____DATA ENTRY:
INITIALS _____
DATE _____

| <u>Work Order</u> | <u>Lab Number</u> | <u>Structured Analysis</u> | <u>Exp. Del.</u> | <u>Analysis Date</u> | <u>Sample ID:</u> |
|-------------------|-------------------|--------------------------------|----------------------|--------------------------|-------------------|
| D096K-1-01 | J-9G200000-295-B | XX I 88 EA 5I | | | INTRA-LAB BLANK |
| D096K-1-02 | J-9G200000-295-C | XX I 88 EA 5I | | | INTRA-LAB CHECK |
| D08JP-1-01 | J-9G200105-001 | XX I 88 EA 5I | | | B0W107 |
| D08JP-1-03 | J-9G200105-001-D | XX I 88 EA 5I | | | B0W107 |
| D08JP-1-02 | J-9G200105-001-S | XX I 88 EA 5I | | | B0W107 |
| D08JP-1-04 | J-9G200105-001-X | XX I 88 EA 5I | | | B0W107 DUP |

Control Limits

(85-115)

(85-115)

(85-115)

0018